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A holistic overview of the UK's offshore renewables potential, and international North Sea cooperation

Executive Summary Presentation

Grant Thornton UK

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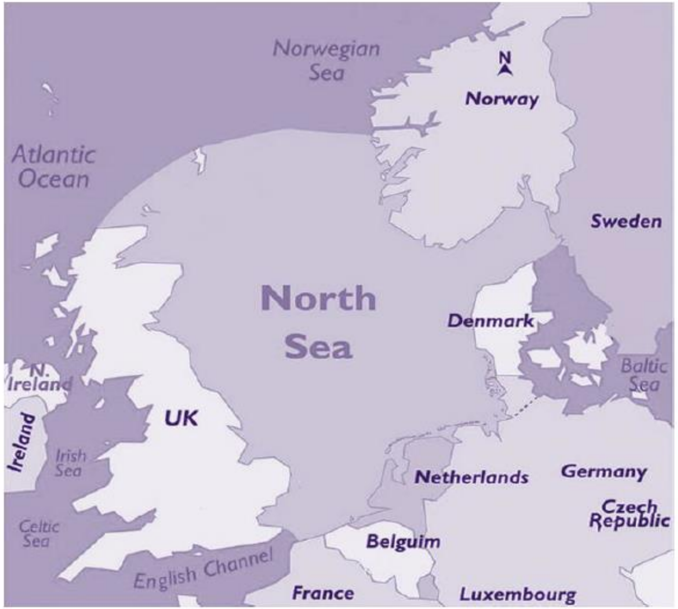
1. Background

Background

"[...] the North Sea has the potential to be the green power plant of Europe, and UK will need to build infrastructure connecting it to neighbouring markets and work with its North Sea neighbours"



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Objectives of the Report

1

To identify **economic opportunities** from a holistic approach in the North Sea through UK domestic coordination and international cooperation for the development of four energy asset types – interconnectors, offshore wind, CCUS and low carbon hydrogen.

2

To understand **the economic and commercial value** to the UK from the holistic interaction between offshore wind, electricity transmission infrastructure (including interconnectors), low carbon hydrogen and CCUS.

3

To **address a gap in understanding** of how UK ambitions and associated economic gains of expanding UK energy infrastructure in the North Sea are: i) dependent on and ii) are amplified by cooperation among countries around the North Sea.

Note: Fieldwork was conducted between January-February 2024, final report prepared for DESNZ in July 2024.

2. Scenario Development & Methodology

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Scenario Development

We developed the following deployment scenarios in conjunction with DESNZ for the four key energy asset types in the North Sea: **offshore wind, interconnectors, CCUS facilities** and **low carbon hydrogen** production:

Scenario 1: Baseline scenario

DESNZ "Known Policy" as of 2022, with sensitivities to reflect Net Zero Higher Demand scenarios

Key features:

- Investment takes place as per current policy objectives to reach the UK's North Sea infrastructure targets in the four asset classes.

Scenarios 2: Holistic domestic scenario

Investment takes place under a holistic approach between UK developers, with coordination across the four infra-structure asset classes on a domestic level.

Key features:

- Co-ordinated grid approach within UK
- Co-ordinated consenting / planning within UK
- Energy "hubs"
- Better co-ordination amongst public bodies and regulators

Scenario 3: Holistic international scenario

Investment takes place under a holistic approach between UK developers and developers in neighbouring North Sea countries (NSC).

Key features:

- Co-ordinated grid approach in international waters
- Co-ordinated consenting and planning with non-UK projects
- Energy "hubs"
- Integration of UK and NSC on transmission and storage
- Compatible regulatory and market regimes

Methodology

Quantitative Analysis

- The **three scenarios formed the basis for assumptions** in the network and power market zonal modelling used to assess the potential impact that the development of the four key energy asset in the North Sea can have on both GB and connected European systems.
- The **system and consumer cost savings** were evaluated as economic benefits of the greater coordination with respect to both the Net Zero Higher and Known Policy baseline scenarios from DESNZ.
  - System costs represent the costs of building, operating and maintaining the power system that include costs of generation, carbon, capital expenditure (capex), fixed operational expenditure (opex), network and interconnector costs.
  - Consumer costs represent wholesale electricity costs and policy support costs such as Contract for Difference (CfD) and Renewables Obligation to Contracts (ROC) schemes for new and existing plants.

Qualitative analysis

The qualitative approach was built on a combination of:

1. an **extensive literature review** of existing research (incl. academic papers, articles and policy documents) regarding international cooperation in the North Sea, focusing on the objective of achieving accelerated energy transition.
2. an **impact analysis** that assessed the wider impacts of the holistic approach and that included both qualitative and quantitative analysis of the social and economic impacts through gross job creation and gross value added (GVA) respectively.
3. **Stakeholder interviews** to gauge a range of perspectives on renewable energy infrastructure and pathways for domestic and international cooperation.

3. Results from Energy System Modelling

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Results from Modelling (1/5)

	Holistic Domestic Coordination	Holistic International Coordination
	(£ billion 2025-50 NPV 2023, real)	
	Known Policy baseline	
System benefit	21.3	24.3
Consumer benefit	14.6	18.3
Total CO_2 reduction	37.1	46.3
	Net Zero Higher	
System benefit	15.6	11.6
Consumer benefit	5.8	12.3
Total CO_2 reduction	(1.9)	(0.4)

Source: Grant Thornton analysis

- Potential for significant system and consumer cost savings:
  - £21 billion and £14 billion system and consumer benefits from Scenario 2 compared to the Known Policy baseline.
  - £15 billion and £5.8 billion system and consumer benefits from Scenario 2 compared to the Net Zero Higher baseline.
  - These benefits increase to approximately £24 billion and £18 billion when the holistic approach is extended internationally in Scenario 3.

Results from Modelling (2/5)
Scenario 2 relative to Net Zero Higher baseline

Component	System benefit	Consumer benefit
	2025-50 NPV £billion (2023 real)	2025-50 NPV £billion (2023 real)
Power market costs	2.3	(0.9)
Electricity network costs	8.3	4.1
CCUS and H2 costs	5.1	2.5
Net benefit	**15.6**	**5.8**

Source: Grant Thornton analysis

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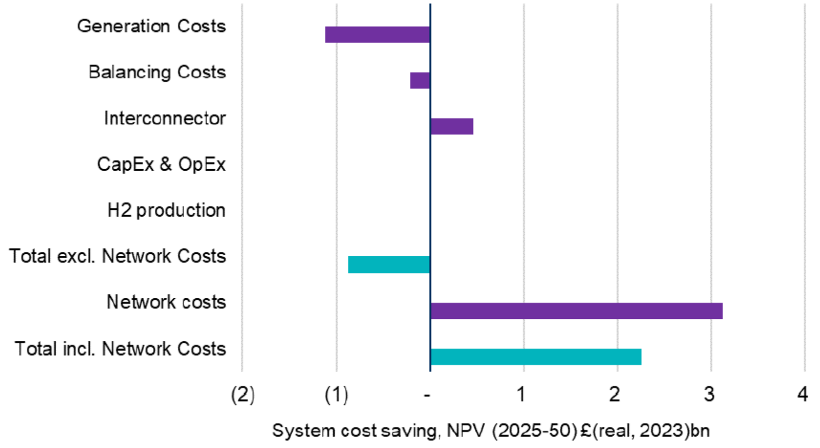
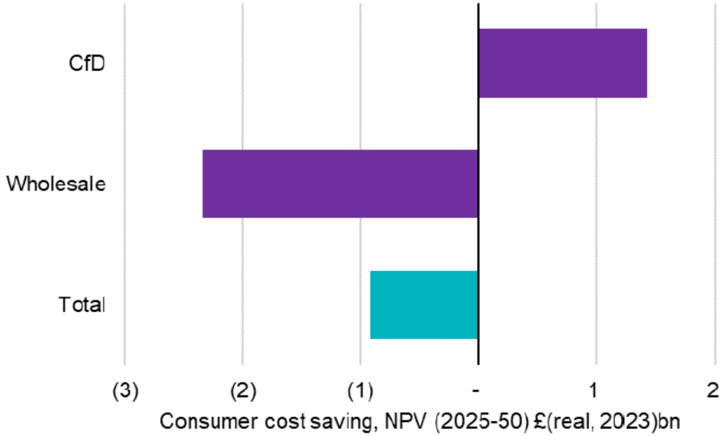
Results from Modelling (3/5)
Scenario 2 relative to Net Zero Higher baseline

Modelled system net benefit in scenario 2 against Net Zero Higher baseline



Source: Grant Thornton analysis

Modelled consumer cost impacts in scenario 2 against Net Zero Higher baseline



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Results from Modelling (4/5)
Scenario 3 relative to Net Zero Higher baseline

Component	System benefit	Consumer benefit
	2025-50 NPV £billion (2023 real)	2025-50 NPV £billion (2023 real)
Power market costs	(1.8)	5.7
Electricity network costs	8.3	4.1
CCUS and H2 costs	5.1	2.6
Net benefit	**11.6**	**12.3**

Source: Grant Thornton analysis

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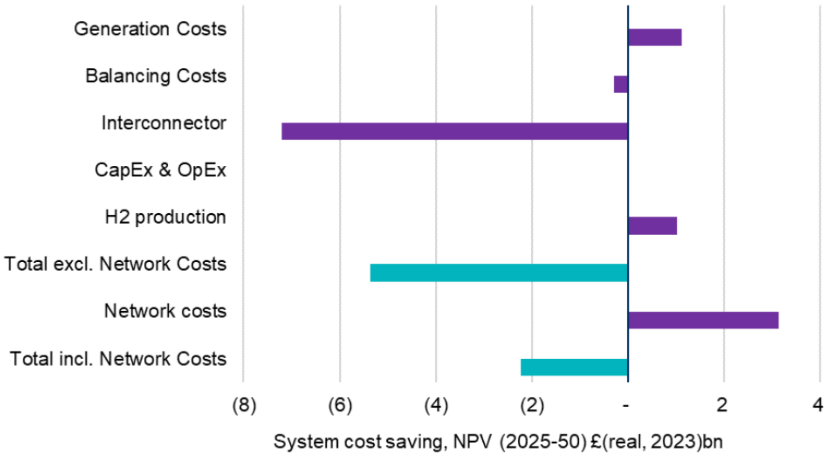
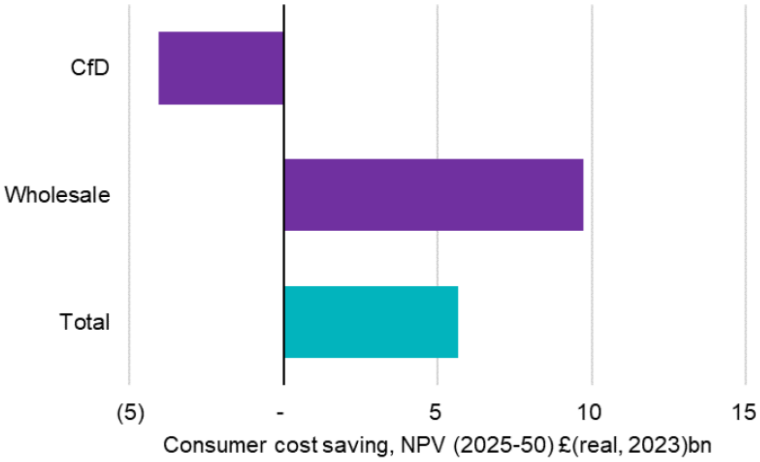
Results from Modelling (5/5)
Scenario 3 relative to Net Zero Higher baseline

Modelled system net benefit in scenario 3 against Net Zero Higher baseline



Source: Grant Thornton analysis

Modelled consumer cost impacts in scenario 3 against Net Zero Higher baseline



4. Impact analysis

Results from Impact Analysis (1/2)

Job estimates compared to the Known Policy scenario baseline

	2030	2050
Baseline	60,500	42,100
Scenario 2	51,000	35,800
Scenario 3	51,000	35,800

Job estimates compared to the Net zero Higher scenario baseline

	2030	2050
Baseline	66,400	134,900
Scenario 2	56,300	115,800
Scenario 3	56,400	115,900

Source: Grant Thornton analysis

- Compared to Known Policy baseline, in Scenarios 2 and 3 the reduction in system costs and increase in Offshore wind capacity by 8% and 10% respectively result in **51,000 additional direct jobs by 2030, and 35,800 by 2050** across the three technologies.
- The Net Zero Higher baseline has potential for higher job creation across the three technologies. The same system cost reduction and increased deployment of Offshore wind result in approximately **56,000 additional direct jobs by 2030, and approximately 115,000 by 2050** in both Scenarios 2 and 3.

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Results from Impact Analysis (2/2)

GVA (low-high) estimates compared to the Known Policy scenario baseline

	2030 (£ billion)	2050 (£ billion)
Baseline	6.63 - 36.47	4.61 - 25.15
Scenario 2	6.64 - 36.51	4.62 - 25.18
Scenario 3	6.66 - 36.58	4.63 - 25.24

GVA (low-high) estimates compared to the Net zero Higher scenario baseline

	2030 (£ billion)	2050 (£ billion)
Baseline	7.28 - 38.39	14.78 - 67.77
Scenario 2	7.32 - 38.65	14.81 - 67.96
Scenario 3	7.33 - 38.71	14.82 - 68.01

Source: Grant Thornton analysis

- Compared to Known Policy baseline, in Scenarios 2 and 3 **the three technologies could create £6.6-36.5 bn in 2030 and £4.6-25 bn in 2050 in additional GVA.**
- Given the potential for higher job creation, the Net Zero Higher baseline has also potential for higher additional GVA to the economy. Compared to Net zero Higher baseline, in Scenarios 2 and 3 the three technologies could add **£7.3-38.7 bn in 2030 and £14.8-68 bn in 2050 to the UK economy.**

5. Stakeholder Engagement

Stakeholder Engagement

15 stakeholder organisations including regulators, trade associations, developers, think tanks, etc. were interviewed in **January and February 2024.**

The range of diverse opinions was used to **identify needs and priorities** of industry parties as well as **risks and challenges** to developing a holistic energy system.

Questions related to the **existing policy and pipeline** for offshore renewables, and how these could change **under the holistic domestic and international scenarios.**

The discussions focused on four key infrastructure types: **offshore wind, interconnectors,** CCUS, **and hydrogen.**

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Key themes

Current* UK Policy

- The **offshore wind and interconnector markets are perceived as mature and stable.** However, **uncertainty surrounded the development of hydrogen and CCUS technologies**, leading to a cautious wait-and-see approach from stakeholders.
- There is concern about the UK's current approach, citing a **disconnect between various policy elements.**

Domestic Coordination

- While some stakeholders believed there was a need to focus on domestic coordination before moving to international cooperation, others believed **both needed to happen simultaneously.**
- **Various challenges around policy, access to finance and supply chains** may hinder the path to cooperation.

International Coordination and Cooperation

- While all stakeholders agree with international cooperation citing **shared energy needs** and **regional market maturity**, opinions diverge on **feasibility.**
- Stakeholders noted an **increased political willingness for cross-border discussions.**
- Most stakeholders stated that **trade policy, port usage, supply chain cooperation, market frameworks, technological targets and financing options** will be the key in shaping up international agreements.
- Policies promoting **technological standardisation** and **harmonisation of regulations** across borders are crucial and currently below expectations.
- **Disrupted supply chains and connection times are major risks** to UK's renewable energy plans (specifically, offshore).

** Note Fieldwork conducted prior to most recent UK Election in July 2024*

6. Key Findings

Key Findings

The UK would benefit significantly from the coordinated development of these four assets, and even more so if combined with increased international cooperation.

1. Potential for significant system and consumer cost savings.
2. Increased international cooperation is expected to drive greater efficiency, which would lead to increased energy production and potentially higher labour productivity.
3. Higher GVA potential where there is greater cooperation and coordination.
4. Environmental benefits are expected, including potential emissions savings, less environmental disruption and better outcomes for marine life.
5. Increased UK security of energy supply due to diversification of sources, greater technological innovation, faster roll out of projects, and increased competition.

7. Contact Details

Contact Details

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Alasdair leads Grant Thornton's Net Zero Practice. Alasdair was formally a Senior Civil Servant in the UK Energy Department and his team now support public and private sector clients on their Net Zero missions – focusing on their commercial and financial challenges.

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Carolina is a Manager in Grant Thornton's Economic Consulting team. Carolina advises clients on a range of energy policy and regulatory economics topics. Prior to this, she worked for the Department for Business, Energy and Industrial Strategy (BEIS), where she provided analytical support and policy advice on key topics related to UK domestic climate targets, international climate finance and international clean energy transitions.

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